

## REMARKS

## **Claim Rejections 35 USC 112**

The rejection of claims 1, 2 4 and 6 - 10 under 35 USC 112 is respectfully traversed.

The examiner's first question in paragraph 2 of the present action is based on a grammatical error and is not relevant to the patentability of the claim.

The examiner has misread the phrase “a Si-C barrier layer containing silicon-carbon bonds that does not have the structure of silicon carbide”

In that phrase, the antecedent of the word ‘that’ is layer, not bonds. That is why the verb is singular, does, to agree with the singular noun layer, not plural to agree with bonds.

Accordingly, the examiner is comparing apples to oranges and there is no answer to the first question that is technically meaningful.

The remaining questions and their answers are:

What is the silicon-carbon bonds structure?

16 The silicon-carbon bonds are covalent bonds.

1           What is the silicon carbide structure?

2           The silicon-carbide structure is either cubic unit cell (zincblende) or  
3           hexagonal unit cell (wurtzite), per Handbook of Chemistry and Physics,  
4           41<sup>st</sup> edition, page 646.

5           How are these structures different?

6           The former is a covalent bond between atoms and the latter is an  
7           arrangement of atoms in a crystal.

8           Applicants disagree with the examiner's conclusion that the claim is  
9           indefinite.

10          In particular, Applicants firmly maintain that the claim is not required to  
11          “provide for the basis of the differences”.

12          The claim is required to describe a structure as well as the technology  
13          permits, not to teach how to make the structure. Teaching how to make the  
14          invention is a requirement of the specification, not the claims.

15          Applicants call the examiner's attention to paragraph 23 of the present  
16          specification. The material produced by the novel method does not have

1 any particular crystal structure. That is why it is referred to as “Si-C”, not  
2 as the chemical formula for silicon carbide, ‘SiC’.

3 Claim Rejections - 35 USC 102

4 The rejection of claims 12, 4, 6, 7, 9 and 10 under 35 USC 102(b) is  
5 respectfully traversed.

6 Claim 1 has been amended to recite explicitly that the barrier layer is Si-C.  
7 The specification states in paragraph 23 that the term means that Si-O  
8 bonds in the silicon surface are replaced with Si - C bonds; i.e. the material  
9 does not necessarily have a 1:1 ratio of silicon to carbon, as silicon carbide  
10 does.

11 Claim 1 has been further amended, in order to distinguish clearly over the  
12 reference, to specify that the structure of the barrier layer is not that of  
13 silicon carbide.

14 In contrast, the Tsunashima reference specifies in Col. 2, lines 56 - 57 that  
15 the interface layer is silicon carbide.

1 Thus, there is a clear distinction between the invention defined by claim 1  
2 and that of the reference. The reference has clearly and unambiguously  
3 specified that the material is a known chemical compound - silicon  
4 carbide, having well known properties.

5 In contrast, claim 1 has specified the material in both a positive manner  
6 and a negative manner. It contains the defined term “SiC” that refers to  
7 what is known about the material and also a negative limitation - the  
8 material is not silicon carbide.

9 In addition, claim 1 further specifies that the Si-C barrier layer has been  
10 formed in the course of a plasma-assisted etch of an oxide layer. This last  
11 restriction serves further to specify the structure of the material.

12 Applicants disagree with the examiner’s statement in the last two lines of  
13 page 3 that ‘ “silicon carbide” is a common name given to a “Si-C  
14 material” ‘, which is understood by Applicants to indicate that the  
15 examiner means any material containing silicon and carbon, no matter  
16 what the ratio of elements or structure.

17 Applicants maintain that silicon carbide refers to a definite compound,  
18 (SiC), just as silicon oxide refers to  $\text{SiO}_2$  and silicon nitride refers to  $\text{Si}_3\text{N}_4$ .

1 The first sentence on page 4 of the action is erroneous. The specification  
2 of Tsunashima states clearly that the material is silicon carbide. There is  
3 no teaching or suggestion in Tsunashima's description that passivation  
4 using C<sub>2</sub>H<sub>4</sub> would produce the structure specified in claim 1.

5 Product by Process Limitation

6 Applicants do not disagree with the examiner's legal conclusion in this  
7 paragraph. Applicants maintain that they have specified a novel structure  
8 that is non-obvious in view of the references.

9 Claim Rejection 35 USC 103

10 The rejection of claim 8 under 35 USC 103 is respectfully traversed for the  
11 same reasons as the rejection under 35 USC 102, since claim 8 is  
12 dependent on claim 1.

1                   For the foregoing reasons, allowance of the claims is respectfully  
2                   solicited.

3                   Respectfully submitted,

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